Check 29. Optimization performance measurement of managed service division in ITIL .pdf

by Arta Sundjaja

Submission date: 17-May-2019 02:58PM (UTC+0700)
Submission ID: 1102514624
File name: performance_measurement_of_managed_service_division_in_ITIL.pdf (431.23K)
Word count: 3464
Character count: 18330

Applied Mechanics and Materials Vol. 234 (2012) pp 124-131 *Online: 2012-11-29*
© (2012) Trans Tech Publications, Switzerland
doi:10.4028/www.scientific.net/AMM.234.124

Optimization Performance Measurement Of Managed Service Division In ITIL Framework Using Statistical Process Control

KASMAN SUHAIRI [a], and FORD LUMBAN GAOL [B]

[1]Graduate Program in Information Technology, Jakarta, Indonesia

[2]F Bina Nusantara University Jakarta, Indonesia

fgaol@binus.edu

Keywords: Configuration Management; Key Performance Indicator; Service Delivery.

Abstract. The purpose of the Configuration Management process is carrying and all IT assets, status, configuration, and relationship between each other being well documented. This documentation is useful, among others, for some purposes. The first objective is to create clarity in the relationship between key performance indicators (KPI) an IT services with the infrastructure. Changes to the configuration of those devices would obviously very disturbing the performance of IT services. The second objective is the accuracy of the information which will be used by the Service Delivery processes. So a Service Desk staff who need to get information about how a user at a branch office to connect to the network's headquarters, linked to issues of access to certain applications.

Introduction

Information Technology Infrastructure Library (ITIL) is a collection of best practices for Information Technology Service Management (ITSM). While the Information Technology Service Management (ITSM) itself is a guide to the processes of IT service that exists in the organization, which wraps all the functional types of IT, which was previously more oriented to an application or infrastructure. ITSM approach aimed at reducing disparities between the language of IT with business unit managers who use IT services, so that the alignment between business and IT can be realized from the very beginning of the IT life cycle. [3]

In the world of cellular telecommunications services, the use of ITIL Service Management in the management of telecommunications networks continues to experience growth. The development of mobile telecommunications technology affects the cellular operators to continue to adapt in order to continue to expand its network capabilities that improve service to customers can be improved in order to achieve customer satisfaction. [6]

One of the mobile operators who wish to enhance customer satisfaction is the PT. XYZ, developed a radio network capacity to accommodate 3G services to customer through upgrading BR10, which is implemented by PT. Nokia Siemens Networks as one of the mobile vendors. Prior to that PT. XYZ has a few problems in the network BSS on vendor. Therefore, the vendor implements BR10 software upgrade to resolve the issue. Use of ITIL Service Management is one of its components is Configuration management is used by PT. XYZ in managing this upgraded BR10. Assessment of the success of the activity of BR10 upgrade is done by looking at Key Performance Indicator (KPI), which translates as the level of quality expected after the upgrade BR10 (radio signal quality), so that the cellular customer satisfaction can be achieved. Apart from that the monitoring of cellular networks continues to be done as an embodiment of the process of Continuous Improvement efforts [11, 13]

The rest of this paper organized as follows: Part 2 will discussed about development of GSM. next the Methodology and conclusion.

The Development Of GSM (Global System For Mobile Communication)

Global System for Mobile Communication (GSM) was first recognized in 1982 and is the name of a committee under the umbrella Conference Europeenne des Postes et Telecommunications (CEPT) formed to define a new standard of mobile telecommunications to replace a wide range of mobile telecommunications standard that is widely used analog in several European countries. Telecommunications standards are designed to use digital technologies that are different from previous standards where analog technology is no longer used. [4]

The first GSM network was launched in 1991 and shortly after its launch, soon most countries in Europe apply to the accompaniment of the spread of GSM technology GSM countries outside Europe. Because of the very rapid development, a term later changed to GSM Global System for Mobile Communications and the GSM standard proved to be the most widely applied on this planet. [16]

At the beginning of the GSM standard is set, only operates on GSM 900-MHz frequency band, where most of the GSM network operates using the frequency band. The use of another frequency band occurred in England in 1993 which uses 1800 MHz frequency band with the commercial name of DCS (Digital Cellular System). Meanwhile, GSM was introduced in North America with the commercial name of the PCS (Personal Communication System) operating at 1900 MHz frequency band. [12].

GSM Network Topology

In Figure 2.2 shows that a GSM network system consists of several subsystem elements are: Network Switching Subsystem (NSS), Base Station Subsystem (BSS), Network Management Subsystem (NMS). On the customer side there is a Mobile Station (MS) which is the tissue that is needed to establish a call consists of NSS and BSS. BSS function to control its radio network (Radio Network) and NSS serves to control the functions of control, therefore all calls would go through the NSS [10, 14].

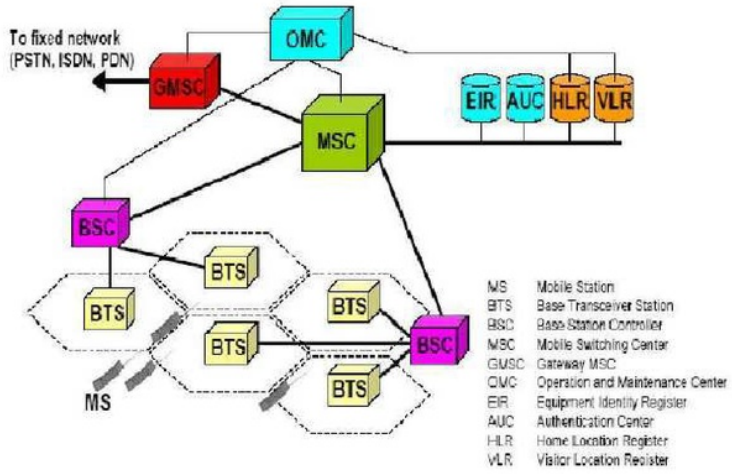

Figure 1. GSM Subsystem [Source [10].

Information Technology Infrastructure Library (ITIL). Information Technology Infrastructure Library (ITIL) is a collection of best practices for Information Technology Service Management (ITSM). While the Information Technology Service Management (ITSM) itself is a guide to the processes of IT service that exists in the organization, which wraps all the functional types of IT, which was previously more oriented to an application or infrastructure. ITSM approach aimed at reducing disparities between the language of IT with business unit managers who use IT services, so that the alignment between business and IT can be realized from the very beginning of the IT life cycle.

In a cellular telecommunications network management, PT. XYZ uses ITIL as its network management technology. ITIL or Information Technology Infrastructure Library, is a framework that created and developed by the Office of Government Commerce (OGC) in England. ITIL is a collection of best practice corporate governance of information technology services in various fields and industries, from manufacturing to financial, industrial large and small, private and government, including the mobile telecommunications sector.

ITIL has grown along with the development of information technology. Figure 2 shows the components contained in ITIL version 3. Fundamental changes in this version is from the perspective of IT management, which in version 2 of ITIL service management as a set of processes and functions while in ITIL version 3 as a life-cycle services [8].

Difference in perspective between ITIL version 2 and ITIL version 3 is only a reorganization and restructuring of the groove, where IT and the business no longer have different views that must be bridged and aligned (alignment), but is expected to IT and business has been directed to view the services as end of all existing processes. Therefore, recycling services starting from the definition hidden strategy, design, transition, operations and continuous improvements made can be done together as well as from the same angle between business and IT. Thus, conceptually no longer required an effort to harmonize between IT and business outlook, because it should have been aligned.

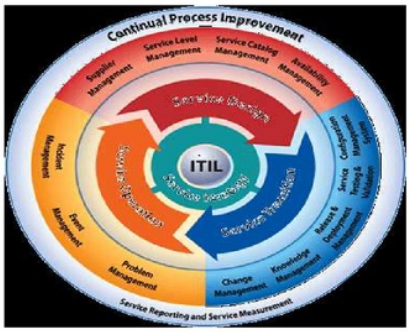

Figure 2. ITIL version 3 [7]

Methodology.

The theory of Managed Service Performance Measurement in PT. XYZ in the ITIL framework using Statistical Process Control (SPC). To deepen the analysis and theory in the making of this research used Several Such references as journals and books. Meanwhile, the authors also made observations directly to the company PT. XYZ to get the data more accurate.

The first thing to do is determine the central line and control limits using data already collected during the observation time on the process conditions in controlled circumstances. A process cannot be determined that in controlled conditions, until it made by control chart of the process. Thus, when the control chart is made first time, the center line and control limits is a trial value which will be experiencing adjustment.

In this research used as many as 8 samples for Managed Service covers the operational areas of regional South Sumatra, Central Sumatra, North Sumatra, Bodetabek, Jakarta, Central Java, East Java and West Java for each of the Trouble Ticket (TT), then do the calculation in samples that expressed in the chart and determine the control limits based on these statistics, then the authors performed statistical values obtained plotting. If the eight samples taken from a deviation occurs, it is necessary to investigate certain cases, followed by process improvement and re-measurement.

So the first step to create a control chart there are three main considerations that need to be decided, namely:

1. Determining the quality characteristics need to be measured.
2. Determining the sampling plan will be created.
3. Establish how much error will be tolerated on the evaluation of control, quality characteristics to be measured are a very important factor, considering closely related to the costs that will result from the output obtained. Meanwhile, the sampling plan is designed to accommodate random data and obtained from a different time each week.

Therefore, fault tolerance (risk of error) is used for ± 3σ, then the risk of errors that will occur is at 100% -99.7% which is equivalent to 0.3%. The following are the steps taken to make the control chart, namely:

1. Collect as many as eight or more samples (n samples) for n scale measurements.
2. Calculate the statistical sample to be used in a control chart.
3. Determining the center line on the average value / mean of n statistical sample.
4. Estimate the standard deviation (σ) of a process. Estimated value of σ will vary and depend on the type of chart used.
5. Determine upper and lower control limits on the ± 3σ control limits (approximate).
6. Doing all samples plotting on the chart statistics on a regular basis.

TABLE I. DATA 8 SAMPLES FOR THE AREAS OF JAVA AND SUMATRA

Week	Avg	Range	Total TT	Tx TT	South Sumatra	Central Sumatra	Bodetabek	Jkt	North Sumatra	Central Java	East Java	West Java
W36	0.5	1	52	4			1	1	1			1
W37	0.75	2	62	6	1	1	2				2	
W38	0.625	2	63	5	2		1	1				1
W39	0.375	1	79	3					1	1	1	
W40	1.375	4	62	11	4	1	1		1	3	1	
W41	1	3	55	8	3		1	2		1		1
W42	0.5	1	42	4	1		1		1			1
W43	0.625	2	25	5	1	2	1			1		
W44	0.875	3	22	7		1	2		3			
W45	0.25	1	33	2			1	1				
W46	1	3	27	8		1	1		2	3		1
W47	1.75	4	36	14	4	2	3		2	1		1
W48	0.25	1	10	2		1				1		
W49	0.625	3	19	5	3	1						1
W50	1	2	19	8	2	2	1		1	1		
W51	0.5	2	20	4					2		1	
W52	0.875	1	17	8	1	1						1
W1	0.5	1	23	4		1			1	1		1

Based on the observation of Table 1 above, the following steps to create control charts:

1. Collect as many as eight samples.
2. Calculate the statistical sample to be used in a control chart.
3. Determining the center line on the value of 8 samples rata-rata/mean statistics.
4. Estimate the standard deviation (σ) of the transmission process.
5. Determine upper and lower control limits on the ± 3σ control limits (approximate).
6. Plot on the chart makes the entire statistical sample.

From the data in Table1 to obtain a calculation result obtained can be seen in Table 2.

Table 2 Trouble Ticket Data Calculation Results

$\bar{R} = \frac{\sum_{i=1}^{k} R_i}{k} = \frac{71}{35} = 2,0286$	$\bar{R} = \frac{\sum_{i=1}^{k} R_i}{k} = \frac{67}{35} = 1,9143$
$\bar{\bar{X}} = \frac{\sum_{i=1}^{k} \bar{X}_i}{k} = \frac{24,375}{35} = 0,6964$	$\bar{\bar{X}} = \frac{\sum_{i=1}^{k} \bar{X}_i}{k} = \frac{22,625}{35} = 0,6464$
$A_2\bar{R} = 0,373 \times 2,0286 = 0,7567$	$A_2\bar{R} = 0,373 \times 1,9143 = 0,7140$
$UCL_{\bar{X}} = \bar{\bar{X}} + A_2\bar{R} = 0,6964 + 0,7567 = 1,4531$	$UCL_{\bar{X}} = \bar{\bar{X}} + A_2\bar{R} = 0,6464 + 0,7140 = 1,3604$
$LCL_{\bar{X}} = \bar{\bar{X}} - A_2\bar{R} = 0,6964 - 0,7567 = -0,0603$	$LCL_{\bar{X}} = \bar{\bar{X}} - A_2\bar{R} = 0,6464 - 0,7140 = -0,0676$
$UCL_R = D_4\bar{R} = 1,864 \times 2,0286 = 3,7813$	$UCL_R = D_4\bar{R} = 1,864 \times 1,9143 = 3,5683$
$LCL_R = D_3\bar{R} = 0,136 \times 2,0286 = 0,2759$	$LCL_R = D_3\bar{R} = 0,136 \times 1,9143 = 0,2603$

From the data obtained in Table 2 above, Average and Range charts obtained as in Figure 1 and 2. The graph is very useful to know and analyze the extent of the influence of the BSS software upgrades on the performance of PT. XYZ data processing method based on SPC.

Implementation on the Telecommunication Industry

We reinforced the importance of using ITIL methods in the management of BSS network of PT. XYZ. because it supports the performance of services to its customers. At this stage the transition is a performed configuration management service to support the development of an existing BSS network, in order to continue to accommodate the needs of customers PT. XYZ increasing.

Based on observations on the operation of the network of PT. XYZ is known that the interplay between one subsystem to another subsystem. Thus we need a reliable Network Management System. Configuration Management conducted by PT. XYZ must be well planned, as well as in the implementation stage should be controlled to the optimum.

In this research used data network that supports the analysis of the activity of BR10 software upgrades that support the performance of PT. XYZ. There are constraints that look at the implementation of planning in configuration management activities. Based on data obtained from these constraints, conducted Further analysis to be drawn a conclusion and a recommendation was made to the performance of PT. XYZ can be Increased. Here is the data in question:

1. The number of events (Trouble Ticket / TT) was recorded, caused by transmission problems in a period of 7 months (September 2010 - April 2011). The total is the sum of TT transmission with BSS.
2. Total events within a period of 7 months (September 2010 - April 2011).
3. Time plans are made to perform a software upgrade activities BR10.

Throughout the above data is processed using the method of Statistical Process Control (SPC), so it can be known at the time when a process is out of control. Then it can be drawn a conclusion and recommendations with the aim to Improve company performance.

In accordance with one of the goals of this research, namely to know and analyze the extent of the influence of the BSS software upgrades on the performance of PT. XYZ based data processing with the SPC method, the authors use Table 1, as the data in the form of 8 samples, the data for areas of Java and Sumatra, which includes the regional South Sumatra, Central Sumatra, North Sumatra, Bodetabek, Jakarta, Central Java, East Java and West Java. Data used for the analysis of SPC is obtained from observation within week 36 (W36) up to week 52 (W52) in 2010, and data within a period of weeks 1 (W1) till week 18 (W18) years 2011. In addition, the authors use the Standard Normal Distribution table to find the value.

Table 1 Data 8 samples for the areas of Java and Sumatra

In the ITIL framework, the results obtained from an activity can be measured using Key Performance Indicator (KPI). PT. XYZ uses KPIs to measure the performance of the entire network. The software upgrade activities BR10 PT. XYZ, also performed measurements of the BSS network performance before and after the activity of BR10 is a software upgrade. From the measurement results can be analyzed whether there was improved performance after software upgrade BR10.

In this research the data displayed KPI Call Setup Success Rate (CSSR) for the month of October 2010, November 2010 and December 2010. CSSR data is also processed by using a system that is integrated with the system Inspur Network Management System (NMS). CSSR is the percentage of Successful calls for talks.

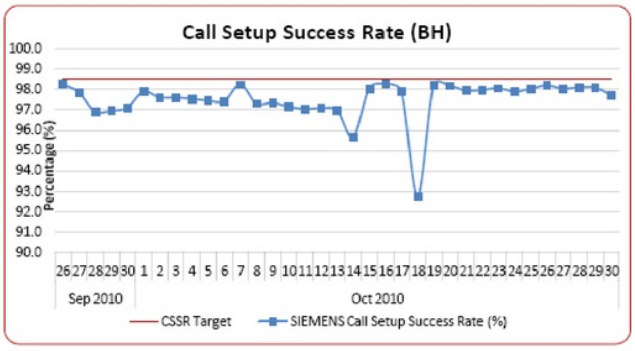

Figure 3. Graph CSSR PT. XYZ October 2010

In accordance with the second objective of this research that is to determine and analyze the extent of the influence of the BSS software upgrades on the performance of PT. XYZ value-based Key Performance Indicator (KPI), then used the data obtained from the IBC CSSR Inspur system shown in Figure 3, 4, & 5.

Figure 4 displays the KPI graph to CSSR in October 2010. While Figure 4.5 displays the KPI graph to CSSR in November 2010. And Figure 5 displays the KPI charts for the CSSR in December 2010. According to the graph, it was found that there was BSS network performance improvements on KPI CSSR occurred in November 2010 and December 2010. In the activity of BR10 software upgrades have been done on some network BSS PT. XYZ. In addition the Inspur system also had taken CSSR data on average in October 2010, November 2010 and December 2010.

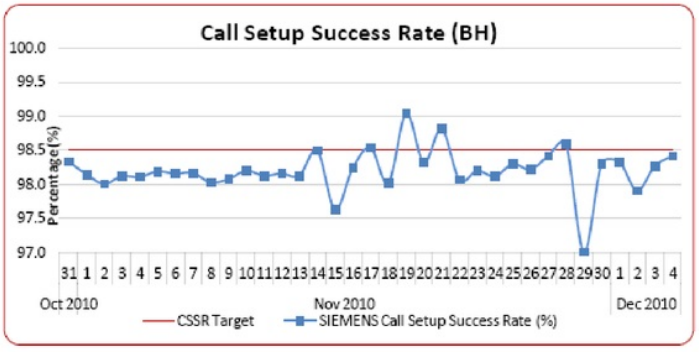

Figure 4. Graph CSSR PT. XYZ month of November 2010

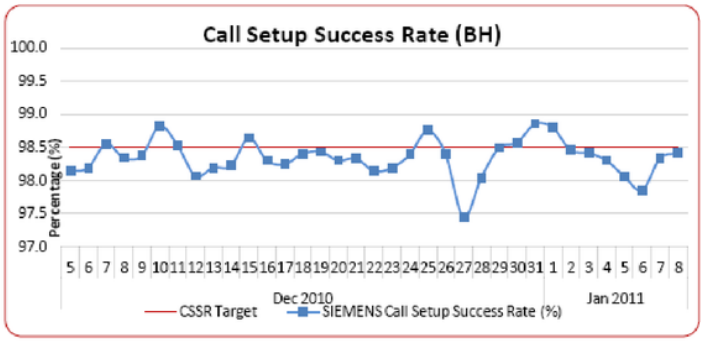

Figure 5. Graph CSSR PT. XYZ December 2010.

The results of performance analysis is used to meet the expected network operating conditions and also can provide a guide in designing the development of BSS networks in the future. In addition to this performance analysis can be obtained accurately from the last condition that the customer needs so the company can optimally determine the next steps in terms of further development of the BSS network.

Under the second objective of this thesis that is to determine and analyze the extent of the influence of the BSS software upgrades on the performance of PT. XYZ in accordance with the Key Performance Indicator (KPI), it is used as Tables Table 4 contains average CSSR data obtained in Inspur system. CSSR data this average to support the KPI analysis of the BSS network. Of the CSSR data is obtained average performance improvement that occurred BSS network of 0.8% in the CSSR. With the increasing value of CSSR, the more calls from customers who succeeded in occupying the BSS network. Thus customer satisfaction in using the services of PT. XYZ can be increased.

Conclusion

From the results of the discussion and analysis of the data processed by SPC and data analysis method IEC CSSR, it can be concluded in accordance with the purpose of this research are:

1. Activity BR10 software upgrade provides a positive effect for the performance of PT BSS network. XYZ. This is shown by a reduced number of Trouble Ticket (TT) of 50% in the operations of PT BSS network. XYZ. This indicated that the BR10 software as new software that replaces the old software, reducing some of the problems that exist in the BSS network.

2. The results of data processing and analysis using Statistical Process Control (SPC), show that there is a process in the Managed Services division of PT. XYZ needs to be improved based on the ITIL framework. That process is management of spare parts. There is an event of unavailability of replacement parts for the hardware module of the BSS network.

3. The results of data analysis based on the value of PT BSS KPI CSSR network. XYZ indicates that the BSS network performance improvement occurs with increasing value of CSSR. With the increasing value of CSSR, the more calls from customers who succeeded in occupying the BSS network. Increasing the value of CSSR in this research by 0.8%. Thus customer satisfaction in using the services of PT. XYZ can be increased.

4. As a guideline to direct the organization's IT and IS firms toward fulfilling the needs of customers better then the development of PT BSS network capabilities. XYZ to address the existing experiences to the BSS network can be done by software upgrades BR10, which is implemented by Nokia Siemens Network (NSN) as one of the mobile vendors. Activity BR10 software upgrade has been managed effectively and efficiently through the ITIL framework, especially in the configuration management so that the results obtained in accordance with the expected value of the KPI.

References

[1] EE Dwinells and JP Sheffer. "The Performance Adavantage" March 1992: P30-p31, APICS

[2] Isabel González , Ismael Sánchez . "Variable Selection for Multivariate Statistical Process Control ". Journal of Quality Technology . Milwaukee: July 2010 . Vol. 42, ISS. 3; p. 242,

[3] Nokia Siemens Network's, "GSM / EDGE Mobile D850/D900/D1800/D1900 Communication System ", 2009, NSN, Finland

[4] Rick Sloop. "Preventive Maintenance your SPC" Journal of Quality Technology , Automated Precision Inc.., Dec 2010

[5] M Siegmund Redl, Matthias K Webber, Malcolm W. Oliphant: "GSM and Personal Communications Handbook", 1998, Artech House London, UK.

[6] Toni Toni Anwar & Lim Wern Li, "Performance Analysis of 3G Communication Network "ITB J. ICT Vol. 2, No. 2, 2008, p130-p157

[7] Thuntee Sukchotrat , Seoung Bum Kim , Fugee Tsung . "One-class-based classification Control charts for multivariate process monitoring " IIE Transactions . Norcross: Feb 2010. Vol. 42, ISS. 2, P107

[8] Finch, BJ., Luebe, RL., "Operations Management: Competing in a Changing Environment", 1995, Harcourt Brace & Co.

[9] Galin, Daniel., "Software Quality Assurance: From Theory to Implementation", 2004, Pearson, UK.

[10] James R. Evans, William M. Lindsay, "The Management and Control of Quality", 2005,

[11] Thomson South Western Mayer, Silvian, "Impact of GPRS on the Signalling of a GSM- Based Network", 1999, University of Sttutgart: Institute of Communication Networks and Computer Engineering.

[12] Nokia Siemens Network's, "GSM / EDGE Mobile D850/D900/D1800/D1900 Communication System ", 2009, NSN, Finland

[13] Ram TS Ramakrishnan, Anjan V. Thakor. "The Review of Economic Studies: Information Reliability and a Theory of financial intermediation", Vol.51, No. 3, p. 415-432, 1984.

[14] Rick Sloop. "Preventive Maintenance your SPC" Journal of Quality Technology, Automated Precision Inc.., Dec 2010

[15] M Siegmund Redl, Matthias K Webber, Malcolm W. Oliphant: "GSM and Personal Communications Handbook", 1998, Artech House London, UK.

[16] TSO (The Stationary Office), "The Official Introduction to the ITIL Service Lifecycle", 2007, ISBN 9780113310616, UK.William, R., Kinney, JR., "Information Quality Assurance and Internal Control", 2000, McGraw-Hill, USA.

Applied Mechanics and Industrial Technologies
10.4028/www.scientific.net/AMM.234

Optimization Performance Measurement of Managed Service Division in ITIL Framework Using Statistical Process Control
10.4028/www.scientific.net/AMM.234.124

Check 29. Optimization performance measurement of managed service division in ITIL .pdf

ORIGINALITY REPORT

19%	11%	9%	14%
SIMILARITY INDEX	INTERNET SOURCES	PUBLICATIONS	STUDENT PAPERS

PRIMARY SOURCES

1	Submitted to University of Pretoria Student Paper	4%
2	www.scientific.net Internet Source	4%
3	Submitted to Eastern Institute of Technology Student Paper	3%
4	eprints.uthm.edu.my Internet Source	2%
5	www.itgovernanceonline.com Internet Source	1%
6	Submitted to Universitas 17 Agustus 1945 Surabaya Student Paper	1%
7	www.ukessays.com Internet Source	1%
8	Submitted to Udayana University Student Paper	1%

9	www.it.vt.edu Internet Source	1%

Exclude quotes	On	Exclude matches	< 1%
Exclude bibliography	On		